

tion was held on Monday at the Mercers' Hall, Sir S. Waterlow, M.P., one of the vice-presidents, in the chair. The most important points referred to in the report were the course taken in reference to the plans and estimates for the central institution, the settlement of the plans for the Technical College, and the technological examinations. With regard to the central institution the Board thought it ought not to authorise the entering into any contract beyond that for which they had the money in hand. The Chairman earnestly hoped that some of the companies that had not yet contributed would subscribe and enable the 20,000*l.* which was yet required to be made up. With reference to the Technical College at Finsbury there was no reason why the foundation-stone of the building should not be laid at an early date. He was glad to be able to state that the Drapers' Company had announced its intention of increasing its subscriptions from 2000*l.* to 4000*l.* per annum, the additional sum to be applied for the first two years towards the cost of building and fitting the Finsbury Technical College. The Vintners' Company had likewise signified its intention of contributing 250*l.* per annum, which showed its sympathy in the work. During the past year the income had been 13,549*l.*, and by the subscriptions received it was raised to 20,765*l.* for the year 1881. The chairman concluded by moving the adoption of the report. Mr. W. Spottiswoode seconded the motion, which was unanimously carried.

At a meeting held at 68, Grosvenor Street, W., on February 18, Mr. George Palmer, M.P., in the chair, it was decided to raise a fund for the purpose of founding an annual prize or scholarship for mathematics in memory of Miss Ellen Watson, to be open for competition equally by men and women, at either University College or the London University. Miss Watson was the first woman to enter the classes of mathematics at University College, London. Her success as a student of mathematics was brilliant, and at the end of the session, in June, 1877, she gained the Mayer de Rothschild Exhibition, which is awarded annually to the most distinguished mathematical student of the year. After passing the 1st B.Sc. examination at the London University, in July, 1879, Miss Watson was obliged by failing health to leave England for Grahamstown, South Africa, where she died last December, aged twenty-four years. It may be added that the Ellen Watson scholarship, or prize, would be the first that has been founded in memory of a woman's mathematical genius and promise of scientific work. A second meeting to determine to which of the above institutions the scholarship should be offered, and to arrange other matters in connection with it, was held yesterday. Subscriptions will be gladly received and may be paid to Miss Alice M. Palmer, hon. sec., 68, Grosvenor Street, W., or to the account of the "Ellen Watson Fund," Messrs. Dimsdale and Co., Bankers, Cornhill, E.C.

PRINCE LEOPOLD will formally open the new University buildings at Nottingham on Thursday, June 30.

At a meeting of the Council of the Wilts and Hants Agricultural College, at Downton, Salisbury, on Wednesday, it was unanimously resolved that the College should henceforth be called the College of Agriculture.

SCIENTIFIC SERIALS

Annalen der Physik und Chemie, No. 2.—On absorption of carbonic acid by wood charcoal, and its relation to pressure and temperature, by P. Chappuis.—On absorption of dark heat-rays in gases and vapours, by E. Lecher and J. Pernter.—New researches on Newton's rings (continued), by L. Sohncke and A. Wangerin.—On the discharge of electricity in rarefied gases (continued), by E. Goldstein.—On the question as to the nature of galvanic polarisation, by F. Exner.—On the same, by W. Beetz.—On excitation of electricity on contact of metals and gases, by F. Schulze-Berge.—Note on F. Exner's paper on the theory of Volta's fundamental experiment, by the same.

Bulletin de l'Académie Royale des Sciences (de Belgique), No. 1.—Geodetic junction of Spain and Algeria in 1879, by M. Perrier.—Fire-damp and atmospheric perturbations, by M. Cornet.—On the excretory apparatus of rhabdocœlan and dendrocoœlan Turbellaria, by M. Fancotte.

Reale Istituto Lombardo di Scienze e Lettere. Rendiconti, vol. xiv., fasc. i. and ii.—Synoptic tables of results obtained in the Botanical Garden of Pavia University from cultivation of fifteen qualities of vine (Asiatic and American species and varieties), by S. Giacomo.—Contribution to the pathology of

voluntary muscles, by C. Golgi.—Contribution to the physiology of strychnic tetanus, by G. Ciniselli.—On Cremonian correspondences in the plane and in space, by C. F. Archieri.—The invasion by the *Peronospora viticola* in Italy, by S. Garovaglio.—On the damage which *Peronospora* may do in Italy in future, by V. Trevisan.—Statistical note on inflammation, on cancer, on cirrhosis, on tuberculosis, and on pyæmia, by G. Sangalli.—Proposed classification of the stature of the human body, by S. Zoja.

Atti della R. Accademia dei Lincei, vol. v. fasc. 2 (December 18, 1880).—Reports on prize competitions.

Fasc. 3 (January 2).—Contributions to the study of medullated nerve fibre and observations on amylaceous corpuscles in the brain and spinal cord, by A. Ceci.—On the bacillus of contagious mollusca, by M. Domenico.—On an equation between the partial derivatives of the inverse distances of three planets which attract one another, by Dr. G. Annibale.—Two small fossil hymenoptera of Sicilian amber, by G. Mulfatti.—On some rare species of Italian birds, by P. Luigi.—On Stilbite from Miage (Monte Bianco), by C. Alfonso.—On ollenite, an amphibolic rock of Mount Ollen, by the same.

Rivista Scientifico-Industriale, No. 2, January 31.—Coglievina's centigrade photometer, by R. Ferrini.

Memoirs of the St. Petersburg Society of Naturalists.—The last volume of the *Memoirs* of the St. Petersburg Society of Naturalists contains, besides the minutes of meetings of the Society, a most interesting paper by Prof. Kessler, on the "Law of Mutual Help," or sociability, which he proves to be the necessary complement of Darwin's law of the struggle for existence.—Ornithological observations in Transcaucasia, by M. Mikhailovsky.—Observations on the motions of diatomaceæ and their causes, by M. K. Merejkovsky.—Materials for the knowledge of the infusorial fauna of the Black Sea, by the same author.—A sketch of the flora of the province of Toula, by MM. D. Kojevnikoff and W. Tzinger, with a map.—Figures showing the quantities of gases in the blood and the quantities of urea and urine secreted by man under various conditions of life, by M. Shitz; and a paper on Medusæ, by M. K. Merejkovsky.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, February 3.—Dr. Klein communicated a paper by John Haycraft, Senior Physiological Demonstrator in the University of Edinburgh, on the cause of the striation of voluntary muscular fibre. The author showed that all the cross striæ observed are due not to any differences of structure along the fibre, but simply to the shape of the fibre itself. The fibre is not a smooth cylinder, but is ampullated, alternate ridges and depressions occurring with beautiful regularity across its length. The striæ correspond with these in position, and are caused by their action on the transmitted light. He showed theoretically how this must be so, and illustrated it with a model of the same shape but of uniform structure, which exhibited down to the minutest detail the cross striæ seen in the muscle itself. He then showed the true explanation of the action of staining agents and of polarised light.

Mathematical Society, March 10.—S. Roberts, F.R.S., president, in the chair.—Prof. Cayley read a paper on the equilibrium and flexure of a skew surface.—Mr. Tucker communicated portions of papers, viz.:—An application of elliptic functions to the nodal cubic, by Mr. R. A. Roberts; and note on Prof. C. S. Peirce's probability notation of 1867, by Mr. H. McColl.—Mr. J. W. L. Glaisher, F.R.S. (vice-president), having taken the chair, the president communicated the following direct analogue in space of the well-known plane theorem, "If we take an arbitrary point on each side of a triangle and describe a circle through each vertex and the two points on adjacent sides, the three circles meet in a point," viz. if we take an arbitrary point on each edge of a tetrahedron and describe a sphere through each vertex and the three points on adjacent edges, the four spheres meet in a point. The analogue was used as a point of departure for the study of four spheres meeting in a point.

Chemical Society, March 3.—Prof. Roscoe, president, in the chair.—The following papers were read:—On the action of Bacteria on various gases, by F. Hatton. An aqueous extract of flesh was used as the source of the Bacteria-containing liquid. A small flask half full of this liquid and half full of

mercury was inverted in mercury. The gas was then passed up. In the case of atmospheric air a large absorption of oxygen was observed. The other gases experimented with were hydrogen, oxygen, carbon monoxide, cyanogen, sulphur dioxide, nitrogen, nitrous oxide, nitric oxide, carbon dioxide, and coal-gas; in all cases the Bacteria remained alive and (except with cyanogen) flourished well. Acetylene, salicylic acid, strychnia (10 per cent), morphine, narcotin, and brucin were equally without effect on the Bacteria. Spongy iron, phenol, and alcohol were very destructive to these organisms.—On the influence of intermittent filtration through sand and spongy iron on animal and vegetable matters dissolved in water, and on the reduction of nitrates by sewage, by Mr. F. Hutton. In the case of peaty water some diminution was observed in the organic carbon, but none in the organic nitrogen. Sewage promotes the reduction of nitrates. Spongy iron converts nitrates into ammonia and free nitrogen.—Prof. Tidy then read a lengthy paper on river-water. This is a reply to the criticisms of Dr. Frankland and Miss Lucy Halcrow on a former paper by the author. In the present paper the author restates his firm conviction that a fairly rapid river, having received sewage in quantity not exceeding one-twentieth of its volume, regains its purity after the run of a few miles, and becomes wholesome and good for drinking.—On β diquinoline, by F. Japp, Ph.D., and C. Colborne Graham. This substance was obtained by heating quinoline and benzoyl chloride in sealed tubes to 240° – 250° C.; it gave on analysis the formula $C_{18}H_{12}N_2$; it crystallises in colourless satiny laminae, and fuses at 191° C.

Anthropological Institute, February 22.—F. W. Rudler, F.G.S., vice-president, in the chair.—The election of F. E. Robinson was announced.—A paper on arrow-poisons prepared by some North American Indians, by W. J. Hoffman, M.D., was read. The information was obtained from prominent Indian chiefs who visited Washington in 1880, and the tribes alluded to in the paper were the Shoshoni and Banak, Pai-ute, Comanche, Lipan Apache, and Sisseton Dakota; this last tribe have a method of poisoning bullets by drilling four small holes at equal distances around the horizontal circumference and filling the cavities with the cuticle scraped from a branch of cactus (*Opuntia missouriense*), the projecting rim of metal caused by the drilling is then pressed over the scrapings to prevent their being rubbed off or lost. As the opuntia is a harmless plant, the idea of poison is evidently suggested by the pain experienced when carelessly handling the plant, which is covered with barbed spines.—A paper by David Christison, M.D., on the Gauchos of San Jorge, Central Uruguay, was read. Having given a description of the country and a history of the people, the author remarked that it had often been a matter for surprise that Englishmen should be able to live safely among a turbulent race of people such as the Gauchos, but our countrymen, when placed in a higher sphere and independent of their political or private feuds, ran little risk in ordinary times; moreover here, as elsewhere, the innate capacity of the British for managing semi-barbarous races by a combination of fair-dealing and kindness was conspicuously manifested. The Englishman had acquired a certain liking for the Gauchos which grew rather than diminished with time. The Gaucho could not be a permanent type, and in the Banda Oriental was rapidly being modified. The more strict definition and sub-division of property, the increase of sheep-farming and change in the management of cattle to the tame system, the rapid extension of wire fencing, and the introduction of agriculture, conspired to cramp his movements and to do away with the necessity for his peculiar accomplishments. It was even to be feared that he himself would pass away, and that the race which ultimately possesses the Campos will show but slight traces of his blood or of the aboriginal Indian race which he represents. The great mortality from murder and homicide which the place was noted for was increased by the numbers who perished under quack doctors. The Gauchos had been badly governed, and much of the evil in them was due to this cause.

Entomological Society, March 2.—H. T. Stainton, F.R.S., president, in the chair.—Mr. E. A. Fitch exhibited a specimen of *Strangalia 4-fasciata*, taken at West Wickham by Mr. A. S. Olliff last August.—Mr. W. C. Boyd exhibited a specimen of *Nonagria luteola*, taken outside the Great Eastern terminus at Liverpool Street, and a curious variety of *Ennomos tiliaria* from Cheshunt.—Mr. W. F. Kirby called attention to a general illustrated work on insects on which Herr Buckeher of Munich is engaged, and laid specimens before the meeting.—The following papers

were then read:—Mr. F. P. Pascoe, On the genus *Hilobus* and its neotropical allies.—Mr. W. L. Distant, Descriptions of new genera and species of *Rhynchota* from Madagascar.—Prof. J. O. Westwood, Observations on the hymenopterous genus *Scleroderma* and some other allied groups.—Mr. McLachlan then called the attention of members to an important paper by Dr. Adler on the dimorphism of oak-gall flies (*Cynipidae*), which has just been published in Siebold and Kolliker's *Zeitschrift für wissenschaftliche Zoologie*, vol. xxxv.—Mr. E. A. Fitch read a report from the *Western Daily Mercury* of the trial which has lately taken place at Yeahampton (South Devon) in reference to the possession of living specimens of the Colorado potato-beetle by a farmer who had brought them from Canada.

Institution of Civil Engineers, March 1.—Mr. Abernethy, F.R.S.E., president, in the chair.—The paper read was on the tide-gauge, tidal harmonic analyser, and tide-predictor, by Sir William Thomson, LL.D., F.R.S.S. L. and E.

EDINBURGH

Royal Society, February 21.—Prof. Fleeming Jenkin in the chair.—Sir William Thomson communicated a paper by Mr. Witkowski on the effect of strain on electric conductivity. A cylindrical brass tube, with a magnet and attached mirror suspended horizontally in the centre at right angles to the axis, was traversed from end to end by an electric current. In its original unstrained isotropic condition the cylinder so conducted the current that the inclosed magnet was unaffected. A couple was then applied in a plane at right angles to the axis, so as to distort the metal tube by a definite twist, thus rendering it *aeotropic* as regards its electrical conductivity, and giving to the current a spiral set, which was evidenced by the deflection of the suspended magnet. The lines of flow set spirally round in a direction contrary to that of the applied couple—a result in complete accordance with the theory of twists, which requires a lengthening (and therefore an increase of resistance) along spiral lines that set round with the couple and a simultaneous compression (and corresponding decrease of resistance) along lines at right angles to these. Quantitative results were obtained by balancing the electro-magnetic action of the current in the strained tube by means of an external circular movable conductor traversed by a steady current.—Sir William Thomson described certain experiments which he had lately made on the effect of moistening the opposing surfaces in a Volta-condenser, and of substituting a water-arc for a metallic arc in the determining contact. The main features of the paper were, the non-existence of any measurable difference of potential when contact was made by means of a drop of clean water between opposed polished surfaces of zinc and copper, the effect of oxidising the surfaces in the pure metallic contact experiment, and the exact similarity in the action of dry polished zinc and wet oxidised zinc when opposed to dry copper and brought into contact by a metallic arc. Sir William also described the "vortex sponge." A vortex column spinning at the heart of a mass of fluid revolving irrotationally inside an imperfectly elastic cylindrical case forms a system in a position of maximum energy; and any slight disturbance from the truly circular rotation of the vortex core results in a gradual drawing off of energy, in virtue of the imperfectly elastic character of the bounding material, until the system assumes its position of minimum energy with the rotationally-revolving fluid on the immediate inner surface of the inclosing case and altogether surrounding the irrotational fluid, which is now in a state of quiescence. The intermediate stages between these first and last conditions are what Sir William Thomson characterises by the name of vortex sponge.—Mr. T. Muir presented a paper on continuants, to which special form of determinant he could, by suitable transformations, reduce any given determinant of ordinary type, and so was able to express a determinant as a continued fraction.—Prof. Chrystal added a note on this paper showing how in the most general case n equations between n unknown quantities can be made to yield by suitable elimination n other equations, in no one of which more than three terms appear, so that a continuant form of determinant is got which bears a simple relation to the determinant formed by the coefficients of the original equations.

MANCHESTER

Literary and Philosophical Society, November 9, 1880.—E. W. Binney, F.R.S., F.G.S., president, in the chair.—On gravitation, by the Rev. Thomas Mackereth, F.R.A.S. December 28, 1880.—E. W. Binney, F.R.S., president, in

the chair.—The literary history of Parnell's "Hermit," by William E. A. Axon, M.R.S.L.

February 22, 1881.—E. W. Binney, F.R.S., president, in the chair.—The president reminded the members present that yesterday was the hundredth anniversary of the first meeting of the Society.—Dr. Balfour Stewart, F.R.S., communicated a letter from Mr. Herman Hager containing notes from Schultz' "Das höfische Leben" with regard to severe winters and famines from 1100 to 1315.—Ozone and the rate of mortality at Southport during the nine years, 1872-1880, by Joseph Baxendell, F.R.A.S.

PARIS

Academy of Sciences, March 7.—M. Wurtz in the chair.—The following papers were read:—On observations of contact during the transit of Venus of December 8, 1874, by M. Puiseux. He is led to divide the nine French observers into two groups (of six and three respectively), there being a marked difference between them in the way of estimating the hour of a contact. Hence the necessity of a sort of common education, ensuring that observers work in the same way.—On the reciprocal displacements of hydracids, by M. Berthelot.—Spiral cells of very great length, by M. Trécul. By macerating, in water, the leaves of certain *Crinum* he found cells from 5 mm. to 13.40 mm. long.—Note on photography of the ashy light of the moon, by M. Janssen. He presented a photograph showing that part of the moon illuminated by light from the earth. The exposure was for 60 seconds. The moon was three days old. The general figure of the lunar continents can be made out. With photography the interesting phenomena in the double reflection of solar light, under varying circumstances, may be more exactly studied.—On the presence of trichinæ in pork of American importation, by M. Bouley. Infection of this pork with trichinæ has probably long been a fact, though observed more lately. Trichino-is is little known in France, thanks to the culinary habits of the people. M. Bouley was sent to Havre to see if a sanitary service of inspection, sufficient for the public hygiene, could be organised. He recommends the initiating of a number of children and young girls in microscopical preparations, for assistance of the meat-inspector to make his examination with the necessary despatch. Should this plan succeed the prohibition of American pork will probably cease.—On the presence of alcohol in the ground, in water, and in the atmosphere, by M. Müntz. He has developed the method depending on the change of alcohol into iodoform, so that one-millionth of alcohol in water can be detected. Alcohol is found in all natural waters except very pure spring water; also (and more of it) in snow. Rain water and Seine water contain about 1 gr. per cubic metre. Alcohol no doubt also exists as vapour in the air. In soils, especially those rich in organic matters, there is a considerable quantity. The destruction of organic matter by various agents of fermentation accounts for the wide diffusion of alcohol in nature.—Observation of solar spots, faculæ, and protuberances at the observatory of the Roman College during the last quarter of 1880, by P. Tacchini. There was a progressive diminution of frequency of spots. The maximum of faculæ of September extended into October. The minimum of extension and height of protuberances fell in October, as well as the minimum of size of spots. For spots and faculæ the maximum frequency was in the same zones as the previous quarter, viz., $\pm 10^\circ \pm 30^\circ$. For protuberances the two maxima are not symmetrical. We are still far from the maximum of solar activity.—Observations of the moon and of Jupiter's satellites at Algiers Observatory during the last quarter of 1880, by M. Trepied. M. Mouchez, in presenting these, the first, astronomical observations from Algiers (where only a little meteorology has been done hitherto), said M. Trepied had lately gone from Montsouris to take charge, and felicitated the Academy on having observations of the moon, &c., in the Algerian climate.—On the algebraic integration of an equation similar to the equation of Euler, by M. Picard.—The formula of interpolation of M. Hermite expressed algebraically, by M. Schering.—On a general reason, justifying synthetically the use of the various developments of arbitrary functions employed in mathematical physics, by M. Boussinesq.—On an integrator, by M. Abdank-Abakanowicz.—On circular double refraction and the normal production of the three systems of fringes of circular rays, by M. Croullebois.—On the enlargement of hydrogen lines, by M. Fizeau. He finds from experiment (with Geissler tubes) that the enlargement is correlative to rise of temperature. Thus the temperature of one heavenly body is higher than another when its hydrogen lines are wider and more nebulous. This agrees with the ideas of Huggins and

Vogel.—On some phenomena of optics and vision, by M. Tréve. Both in vision and in photography it appears that light is propagated with more intensity through a horizontal than through a vertical slit.—On the solubility of chloride of silver in hydrochloric acid in presence of water, or of little soluble metallic chlorides, by MM. Ruysen and Varenne.—On the heat liberated in combustion of some substances of the saturated fatty series, by M. Louguine.—On the transformation of glucose into dextrine, by MM. Musculus and Meyer.—On an active amylamine, by M. Plimpton.—On active propylglycol, by M. le Bel.—On the winter of 1879-80 in the Sahara, and on the Saharan climate, by M. Rolland. The winter was exceptional. North-east and north winds prevailed. The mean temperature from January 17 to April 16, between 35° and 30° lat., was only $14^\circ.1$; the extremes $-4^\circ.7$ in the night of January 17-18, and $31^\circ.1$ on April 13 in the day. Rain fell several times in the Algerian Sahara, and abundantly in the end of January. It comes generally at intervals of over ten years. The Saharan climate seems to have degraded. The region had probably at one time a larger population.—M. Melsens showed in a letter the economy realised by his lightning-conductors.—M. Zenger presented a photograph of the sun taken at Prague during total eclipse, in a very clear sky.

VIENNA

Imperial Academy of Sciences, March 10.—L. T. Fitzinger in the chair.—Dr. P. Weselsky and Dr. R. Benedikt, on the influence of nitrous acid on pyrogallic acid.—T. B. Tanovsky, on a new azosulfobenzoic acid.—Domingo Coglievina, on the Centigrade-photometer, a new optical instrument for determining the intensity of any source of light.—Dr. M. Buchner, analysis of the water from the "Lindenbrunnen," at Zlaten, near Pernegg (Styria).—Dr. Max Margulies, on the determination of the coefficients of friction and sliding by the plane motions of a fluid.—Dr. T. Kreuz, on the development of the lenticells in the shadowed branches of *Ampelopsis heteracea*, Mels.—Dr. Hann, on the daily course of the meteorological elements on the plateau of the Rocky Mountains.—T. B. Heindl, on crystalline combinations of chloride of calcium with alcohols.—Dr. T. Herzig, on the influence of sulphuric acid on mono-di- and tribromo-benzol.—Alex. Lustig, on the determinations of nerves in the smooth muscles.—F. Toula, report on his geological researches in the western regions of the Balkans.

Imperial Institute of Geology, March 1.—R. M. Paul, on the occurrence of petroleum in Wallachia.—Dr. E. Tietze, on some detritus-formations on the southern slope of the Persian Albur Mountain.—Dr. V. Hilber, exhibition of geological maps of Eastern Gallicia.

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